Project Code and Title

B.01.12 - Improved Frontal Crash Protection

Project Objective

The object of this research program is to mitigate the fatalities and injuries that will continue to occur each year even after full implementation of air bags in cars and light trucks and vans. Of specific interest is to reduce or eliminate serious to fatal injuries caused by deployment of the air bag.

Background

By the end of the century almost all light vehicles sold in the US will have driver and passenger air bags. This research program will address these injuries/fatalities through development of crash tests with impact conditions not currently addressed by FMVSS No. 208, development of additional or more appropriate instrumentation and injury criteria on the test surrogate, and evaluation of other sizes of test surrogates. Recently several fatalities and serious injuries have been reported which appear to be caused by air bag deployment. Research is being conducted to assess the problem, with testing and analytically, and to investigate techniques for reducing the aggressiveness of air bags.

Problem Definition

After full implementation of FMVSS 208, the latest agency estimates are that frontal impacts may still account for about 7,500 to 8,500 fatalities and 120,000 AIS 2 and greater injuries. In addition there have been several reported injuries and fatalities caused by the deploying air bag.

Research Approach

The program is separated into two phases:
Phases I will address development of test procedures for increased benefits for occupants in frontal impacts and consists of tasks:

1. NASS data will be used to identify laboratory test conditions;

2. Safety performance analysis will develop a data base of crash parameters and identify vehicles to be used in testing;

3. A "Problem Determination" document will be developed from items 1 and 2 along

with biomechanical input on injury mechanisms for frontal impacts;

4. Computer models will be selected for simulating vehicles in frontal accidents;

5. Based on the "Problem Determination", with the recommended test device, test procedures will be developed.

Phase II will address current issues with air bags in use, particularly, injuries and fatalities due to air bag aggressiveness and consist of the following tasks:

1. General analysis of injuries\fatalities with air bags, analysis of fatalities to children under 15 with air bags and analysis of fatalities to drivers, to specifically identify cases of air bag aggressiveness contributing to the injuries/fatalities;

2. Laboratory testing to evaluate aggressiveness of current air bags, to develop less aggressive air bags and to develop test procedures for assessing air bag aggressiveness.

Potential Impact/Application

Develop upgraded test procedures for FMVSS No. 208. Propose potential changes to air bag designs which will reduce injuries/fatalities from air bag deployment.

Key Milestones

- Report on Assessment of Down-Loading 9/97
- Problem Determination Report 10/96
- Completion of Test Development 12/96
- Rulemaking Decision on Upgrade 1/97

RESOURCE REQUIREMENTS	FY96	FY97	FY 98	FY	FY
Contract Money ($K)	1,800	1,500	1,000		

Project Manager(s)

Ed Jettner and Lee Stucki

Completion Date

I. Decision on Upgrade FMVSS No. 208	1/97
II. Air Bag Aggressiveness	1/98

Publications

- "NHTSA's Improved Frontal Protection Research Program", Lee Stucki and William T. Hollowell, NHTSA, Paper No. 96-S1-0-09, Fifteenth International Technical Conference on the Enhanced Safety of Vehicles, Melbourne, Australia, May, 1996.

Keywords: Air bag, frontal, offset, aggressiveness

Project Tasks

Task	**Title and Description**
Phase I.	**Upgrade FMVSS No. 208**
Tasks 6a &7a	Redo Problem Determination & RD Support for RM Decision
Task 8	Computer Model Selection
Task 9	Test Device Development
Task 10	Test Procedure Development
Task 11	Baseline Evaluation of Performance Limits
Task 12	Model Applications
Task 13	Analytically Evaluate Mitigation Concepts
Task 14	Develop and Test Mitigation Hardware
Task 15	Evaluate Performance at Various Criteria Levels and Analyze Costs and Benefits
Phase II.	**In-Use Air Bag Fleet Issues - Air Bag Aggressiveness**
Task 16.	Accident Analysis a. General Analysis of Air Bag Fleet (see Tasks 6 and 7) b. Case Review of Air Bag Fatalities to Child Passengers c. Case Review of Driver Air Bag Fatalities
Task 17.	Aggressiveness Evaluation Testing and Improvements a. Upper Extremity/Air Bag Research Program b. Assessment of Out-Of-Position Occupants with Air Bags

Task	Start Date	Projected Completion Date	Status/Responsibility
6,7	1/95	10/96	Ongoing/Stucki
8			Completed
9			Completed
10	1/91	1/97	Ongoing/Ragland
11	1/91	1/97	Ongoing/Ragland
12	1/91	1/97	Ongoing/Samaha, Summers
13		TBD	TBD/Stucki
14		TBD	TBD/Stucki
15	10/96	1/97	Planned/Stucki
16	1/96	1/98	Ongoing/Stucki
17	1/96	1/98	Ongoing/VRTC